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The Research and Development of an Educational Platform Based on Integrable Ware

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Abstract

Computer Assisted Instruction, emerging from the traditional computer technology, is a new approach applied to the field of education which brings dramatic changes to the traditional teaching methods, styles, and content. This paper proposes a model of education system based on integrable ware has been created after the research on the structure of education system; The characteristics of the system structure are discussed, the infinite combinations of principal point are adapted to the ever-changing teaching practice and some functions of the education system have been realized.

*KeyTerms:*Integrable ware, education system, CAI, streaming media, evaluation

1. Introduction

Computer Assisted Instruction, distinguish from the traditional computer technology, is a new approach applied to the field of education which brings dramatic changes to the traditional teaching methods, styles, and content. However, due to the features like integrity, solidity and no-openness in courseware itself, it is difficult to adapt to the ever-changing teaching and learning requirements and it also restricts the development of personality and creativity of both teachers and students. At the same time, with the rapid development of network technology, network teaching system has become the inevitable trend of the development of CAI.

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2. The Definition and Characteristics of Integrable Ware

Integrable Ware is an educational software in which teachers and students can combine multimedia teaching information resources together according to their own needs. The idea of Integrable ware is the further development of Computer Assisted Instruction and also a theory and practice of preparation, retrieval, design, composition, use, management and evaluation for multimedia teaching information resources and teaching process [1]. Integrable Ware has the following characteristics:

Primitives

Integrable ware resources are basic elements consisting of every single principle point and each point is a primitive module with the functions of classification, retrieval, construction, etc.

Integrability

Knowledge primitives in the Integrable Ware system can be reorganized, accumulated and alternated when needed.

Universal

The Primitive information can be flexibly applied by different teachers in actual teaching activities no matter how course system or text version changes.

Openness

Integrable ware material resources and teaching strategies resources are stored by means of Primitives for teachers to recombine. Therefore, teacher or student can add or use the latest information into the storage anytime and anywhere.

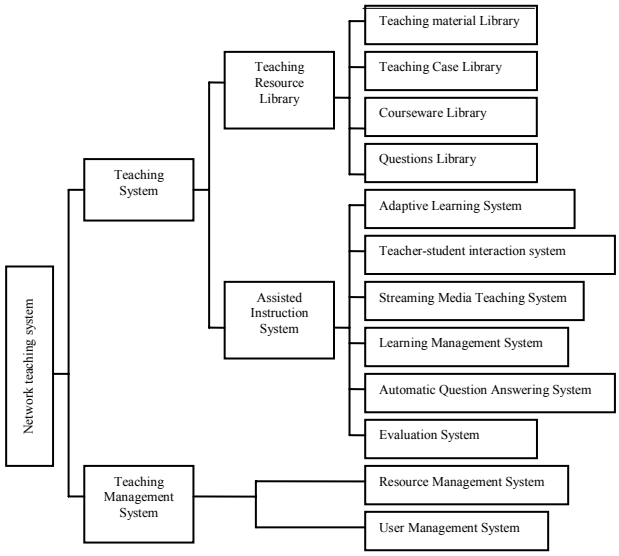

Figure 1. The Model of Network Teaching System Based on Integrable Ware

3. the Composition of Teaching system Based on Integrable ware Thought

The Author designed a teaching system model based on the characteristics of the actual teaching and integrable ware idea (as shown in figure 1)

Teaching Resource Library

Teaching Resources are collected mainly in the following ways:

- Teaching plans, courseware and other resources provided by teachers. They are done by teachers themselves and usually modified several times during the teaching process. Therefore, the plans are valuable and are essential resources in Network teaching resource library.
- The resources are produced by the subject teachers and resources builders.
- The resources are collected by the resources builders from the internet according to the necessity of the resource library.
- Purchasing series of material, courseware, and network courses CD-ROM. The resources can be exchanged between resource library according to a certain degree of agreement or relationship of trust [2].

Assisted Instruction System

- Adaptive Learning System. Adaptive learning system dynamically shows the hypermedia teaching content which is related to the learners' current study capability based on the characteristics of the students. Adaptive learning system can provide more favorable conditions for web-based study, and the system makes the network study become easier, more efficient and personalized. It can form the network aided teaching pattern to meet the individual needs.
- Teacher-student interaction system. Interaction between teachers and students is a very important aspect in teaching and learning activities. During the interaction, students can get answers to the questions; Teachers can also understand the current situation of student learning process. In Network teaching system, an effective environment for communication can effectively improve the quality of teaching.
- Streaming media teaching system. Teaching system based on streaming media on the Internet is similar to implementation of the teaching TV video. It maintains the image of vivid and lively TV teaching and at the same time increases the display function of the teaching script with the features of two-way communication and courseware on-demand.
- Learning Management System. In web-based teaching system, teachers are still a very important participant, which can assist the lack of intelligent computer systems. Learning management system should have the functions of guidance, troubleshooting, collaboration, monitoring, implementation of intelligent and personalized learning environment, score management and learning schedules.
- Automatic Question Answering System. In teaching design stage, teachers will store the most common problem of this subject into the knowledge library in a certain way of organization. When students encounter problems, the questions are submitted to the network. The system will carry out intelligent retrieval in the knowledge library on the basis of the description about the questions submitted by students and presents the answers to the students in accordance with the level of the relevant content of the retrieval. When failing to find the answers to the questions in retrieving knowledge library, the system will notify the students, and automatically e-mail the questions to

the subject teachers or the Internet to seek answers. When other students provide answers, the system will send e-mail notification to the students.

- Evaluation System. Evaluation system includes test library, tools to generate test papers, testing process control system and test results analysis tools, exercise layout and marking operation tool [3].

Teaching Management System

Teaching management system is mainly used to manage and maintain the teaching resources, mainly composed of two parts:

- Teaching resources management. It is mainly used to add, modify, or delete teaching resources. Users can add the designed integrable ware to the teaching resources library. The system administrator can modify the information of integrable ware in the resources library and at the same time, the system administrator can delete some resources of integrable ware according to certain necessity.
- User Management. It mainly includes two functions: add administrator or add users. System administrators can add or remove two types of users. Users can only download, upload, retrieve and browse integrable ware. Newly added system administrator has all the privileges that a system administrator should have, so be prudent to add a new administrator. At the same time, in order to ensure the system security, the times of illegal log on to the system should be clearly restricted. After a certain number of illegal log, its IP address will be locked by the system administrator. The system administrator can unlock this illegal IP address in the other IP address.

4. The Design of Integrable Ware and Integrable Ware Management in C Program Teaching System

Integrable ware resources design

Integrable ware library with the openness, scalability and availability has been developed. We provide users with a large number of mini-courseware and teaching materials for some relevant computer program design courses. Users can select courseware directly from integrable ware library through WEB browser or combine these multimedia materials to meet the needs of teaching and learning.

Figure 2. The Animation on the Scheduling Problem

Integrable ware includes media material, item bank, paper material, courseware and network courseware, teaching cases, etc. People often use Flash and Authorware to create Integrable ware. Flash provides a complete drawing tool to draw web pages animation and both can be transferred into the documents of other vector drawing software, and it also supports graphics, sound and Gradient Color. The

use of Flash's scripting language can easily design and create highly interactive animation, improve interactive performance for Integrable ware. When Flash animation is completed, you can type the output file for the EXE running under Windows or saved as a SWF file format used in the HTML file and then become directly available online. Authorware is intuitive, simple and easy to use; it is object-oriented, icon-based development environment. It is an icon-based model with the process of its editorial line. It is based on the icon, edit mode is the process line. It combines text, graphics, images, animation, audio and other instructional media together into one, you can deal with multiple objects parallel while not only handling text, but also handling hypertext.

Integrable ware Management System design

Integrable ware management system is mainly used to manage and maintain the teaching resources. Integrable ware management system includes two parts which are Integrable ware management and user management. When the Integrable ware changes, that is, the Integrable ware itself being modified, deleted or added, the information on the description of the Integrable ware itself also need to change accordingly.

Integrable ware management system has the following functions: When a new Integrable ware is stored, add the information of the Integrable ware; when it is deleted, then delete the relevant parts of the description information of the Integrable ware; and we can also modify the description information of the Integrable ware.

User management includes adding users and the administrator. System administrators can add or remove two types of users while users can only upload and download Integrable ware, retrieving Integrable ware and visiting the Integrable ware. Newly added system administrators have a system administrator with all privileges, so we should be careful when adding a new administrator. Meanwhile, in order to ensure system security, we explicitly limit the number of illegal sign-on system. Its IP address will be locked, when the

Figure 3. The Integrable Ware Management Interface

illegal log reaches a certain number of times and the IP address can be locked by the system administrator in the other IP address to unlock.

Evaluation Test System Based on Integrable Ware design

In evaluating test system, students can extract the corresponding difficulty level of the questions according to their own needs from the item library, and students can answer these questions online. The system will give the grade according to test results, degree of difficulty and other scoring elements. The system will accumulate these scores in the form of points. Teachers can design a number of incentive policies to stimulate students to participate in testing on their own initiative.

Through the system, on one hand, teachers will know about the progress of student learning via convenient remote web test paper and question setting; on the other hand, it is an easy access for the students to review and take tests via the web in order to consolidate and expand knowledge. The teachers, however, can be clearly informed of student learning situation, they can search by changing the conditions to carry out related queries, draw relevant conclusions, thus to creat appropriate teaching strategies.

Key technology of this system include: Students are free to choose item difficulty level and can be randomly selected to access self-examination questions testing; students can view the history of answering records; system can automatically generate points; Teachers can pre-test paper strategy; network test database management (including remote collection, search, add and delete, etc.); customized background inquiries; teachers' customized inquiries.

Figure 4. The Query Interface of Evaluating Test System

Conclusions

The teaching system based on integrable ware idea has overcome some shortcomings of courseware, such as mechanicalness and solidility, etc. The system use the infinite combinations of principal point to adapt to the ever-changing teaching practice, which makes it possible for teachers to construct their own teaching material and teaching methods based on the actual situation of students and which provides broader world for educational reform [4]. The suitable teaching software should be designed by both teachers and students based on the actual needs and situation, thus to stimulate the enthusiasm of both teachers and students, improve teaching efficiency and truly exercise the dominant position of students in the teaching process so that studying subjectivity of students can be ensured.

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